

IX. *Further Observations on the Genus Anthophorabia.*By GEORGE NEWPORT, *Esq.*, *F.R.S.*, *F.L.S.* &c.

Read February 3, 1852.

HAVING had the good fortune, in September last, to re-discover in the nests of *Anthophora*, at Gravesend, the Chalcididous parasite *Anthophorabia*, which, twenty years ago, I found at Richborough in Kent—and an account of which is given in my paper on the *Chalcididæ* and *Ichneumonidæ*—I feel it necessary to offer a few additional observations on this insect; since one of the most remarkable peculiarities of its male sex—and on account of which the *genus* was characterized and named in that paper—has been denied to be a fact—the denial being printed in the “Proceedings” of the Linnean Society*, and elsewhere†. The peculiarity to which I allude is the possession of a single stemmatous eye, in the place of a compound eye, at the sides of the head in the male.

At the time of communicating my paper on the *Chalcididæ*, &c., to this Society, I was not in possession, as was then pretty well known, of specimens of the insect itself, but only of delineations which I had made in the year 1831 from living specimens, and at which time, and for two or three years afterwards, I found the insect in such abundance that, expecting to be able to obtain it at pleasure, I neglected to preserve it. Through the long interval of time which has since elapsed, up to September last, I have not again been able to find it. It was upon the very fact of the existence of stemmatous eyes, in the place of compound ones, in this insect, that some important physiological deductions in my paper are founded; and thence it was reasonable to expect that every inquirer would have believed that of this fact, at least, I must have been quite certain, before venturing to deduce conclusions. Yet this has been repeatedly questioned by Mr. Westwood, and even in the “Proceedings” of the Society itself‡.

As I am now in possession of specimens of the insect, which I beg to lay before the Society§, I am enabled to prove that not only do stemmatous eyes, instead of compound ones, exist in the male, as I have stated, but also that the principal characters given in my paper as marking the genus,—the enlargement and excavation of the basilar joint of the antenna, as well as the enlargement of the middle joint,—are correct. The male has a single stemmatous eye on each side of the head, and three stemmata on the vertex, so

* Vol. ii. p. 37.

† Gardeners' Chronicle, May 12, 1849, p. 295. Annals and Mag. of Nat. Hist. (2nd ser.) No. 19, vol. iv. p. 39, July 1849. Trans. Entom. Soc. vol. v. part 7, 1849, p. lxxv.

‡ “The asserted possession of stemmatous eyes by the male was regarded as erroneous, there being no instance of such a structure, throughout the whole range of winged insects, whilst it is essentially a character of some of the wingless tribes.”—Westwood in Proceedings of the Linnean Society, vol. ii. p. 37.

§ Specimens of both sexes of the insect were exhibited at the Meeting.

that, with the insect before us, we are now enabled to demonstrate that this little creature really does possess the eyes stated*. It is but just, however, to mention, that with regard to some other details of less importance, my former description admits of revision; but any occasion for this, although asserted, could only have been guessed at as vaguely as with regard to the eyes, by those who have never seen my insect. Thus I now find that the club of the antenna, in both sexes, is formed of a plurality of closely-united immovable segments, instead of being but a single joint; a circumstance which affects the declared *number* of parts of which the antenna is composed; and the possibility of which I have elsewhere admitted†. Further, the number of joints in the tarsi may either be regarded as *five*, as I have described them, if, as anatomists, we consider as a distinct joint the pad-like terminal portion of the foot; or as *four* only, if this part be discarded, and the number be computed in the way usual with entomologists.

With regard to the supposed identity‡ of *Anthophorabia* with the insect mentioned in my paper of the 20th March, 1849, p. 64, on the *Chalcididae*, and which had been named *Melittobia*, but which, up to that period, had not been described§, there cannot be much difficulty in arriving at a conclusion in the negative; if the description in the accounts given by the entomologist who has since repeatedly characterized the latter insect be correct. Thus the male of *Anthophorabia* has stemmatous eyes, while that of *Melittobia* is described as having "eyes and stemmata wanting||," or as "omninò cæcus¶," or "cæcus**." And again, the male of *Anthophorabia* has the middle joint of the antennæ "large and globose" or subangulated, while that of *Melittobia* was first stated to have "2nd and 3rd joints small, nearly equal, 4th, 5th and 6th very small and subannulose††," and afterwards these characters were revised by the omission of all reference to the second and third joints, the statement being simply "articulis 4to, 5to et 6to minimis‡‡." So that, presuming these several descriptions to express the fact, the question must be looked upon as decided.

Thus much then with regard to the identity of the *genus Anthophorabia*. In respect of the *species* there appears to be even less difficulty, *Anthophorabia retusa* being described both *generically* and *specifically* in my former paper, while no *specific* characters whatever have even as yet been published of *Melittobia Audouinii*.

I now propose to revise the generic description of *Anthophorabia* in the following manner:—

Fam. CHALCIDIDÆ.

Gen. ANTHOPHORABIA, Newp.

Fem. Caput latitudine thoracis. *Antennæ* 9-articulatæ, pilosæ; articulo 3tio ad 6tum subæqualibus; reliquis clavam solidam ovalem efformantibus. *Thorax abdomenque* æquales. *Tarsi* (4-?) 5-articulati in utroque sexu; articulo 5to minimo pulvillo simili, ferè obsoleto.

* Page 63. † Ann. and Mag. of Nat. Hist. August 1849, p. 123. ‡ Proc. Linn. Soc. vol. ii. p. 37.

§ See Mr. Westwood's "Introduction," &c., vol. i. p. 18. "The species has not yet been described." Also, Trans. Ent. Soc. vol. v. part 3, 1848 (Proceedings), p. xviii. || Gardeners' Chronicle, May 12, 1849, p. 295.

¶ Transactions of the Entomological Society, vol. v. part 7, p. lxx. 1849.

** Proceedings of the Linnean Society for May 1, 1849, vol. ii. p. 37.

†† Gardeners' Chronicle, *ubi suprâ*.

‡‡ Trans. Ent. Soc. and Proc. Linn. Soc. *ubi suprâ*.

Mas. Caput magnum. Oculi stemmatosi. Antennæ 10-articulatæ; articulo 1mo globoso, minutissimo; 2do arcuato, magnoperè dilatato, dimidio anteriore subtùs excavato; 3tio magno; 4to adhuc majore, globoso v. subangulato; 5to, 6to, 7moque minimis, cyathiformibus; 8vo, 9no, 10moque auctis, clavam solidam ovalem efformantibus. Alæ abbreviatæ.

As the specimens which I now possess afford some specific characters which I do not remember to have observed in the specimens formerly obtained at Richborough, and as I do not possess any of those to compare with them, I propose to name the species I have obtained at Gravesend, *provisionally*, in the event of its proving to be distinct, *Anthophorabia fasciata*, and to describe it as follows:—

ANTHOPHORABIA FASCIATA; *Mas.* Fulva, fasciis 5 transversis abdominalibus saturatoribus, antennarum articulis anterioribus oculis prothoracis margine posteriore maculæque subalari utrinque in mesothorace nigrescentibus, pedibus subareuatis robustis ambulatoriis, trochantere femorumque paris secundi parte terminali subtùs spinulis minutis densè barbatis, tibiis tarsisque omnibus fortiter spinosis.—Long. lin. 1.—*Fæm.* Nigro-ænea nitida, lineis 2 longitudinalibus in mesothorace scutelloque albidis, abdomine ovali elongato acuto fasciis transversis saturatoribus pilis albidis marginatis, oculis rufescentibus, pedibus flavescentibus, femoribus saturatoribus, tibiis rectis elongatis pilosis, tarsis pilosis fortiter spinosis.

Hab. in nidis *Anthophoræ retusæ*, juxta Gravesend in com. Cantio.

These insects were found while myself and a friend were searching for the larvæ of *Monodontomerus nitidus*, on the 14th of September, 1851, at Gravesend; and although met with in only one bee's nest, I was fortunate in securing nearly one hundred and fifty specimens. Most of these were still in the nymph or pupa state, but some of them had already become imagos. On examining them on the following day, I found that several more had recently changed; and while I was engaged in watching them, I had the satisfaction to observe two males throw off their coverings. Having placed the whole in a shallow vessel covered with glass, I was enabled to watch their proceedings. These males began immediately to traverse round the interior of the vessel leisurely, but very assiduously, touching and turning many of the yet undeveloped female nymphs with their antennæ. Occasionally they raised their rudimentary wings, but made no attempt to fly, or even to leap, as the females frequently do, although they were in no way confined for room. In this manner they continued to roam about, without making the slightest effort to escape, their sole attention being evidently directed to the unhatched females.

The males appear to be very few in number in proportion to the females, as out of the hundred and fifty specimens obtained I could only find eleven. They are also very short-lived, as the whole of those which came forth in the afternoon of the day subsequent to that on which they were found, were dead on the following morning. The females were much longer-lived, and not only crept about freely, but occasionally leaped to a considerable distance.

I was not able to observe any direct communication between the sexes, notwithstanding the apparent attentions of the males in the way I have mentioned. Yet there afterwards appeared reason to believe that some of the females had been fecundated, probably, as for-

merly suggested, while they were still included in the closed bee's nest. I had placed nearly a hundred females, including some which had been hatched in the closed cells, and others which I afterwards saw change from the nymph, in a glass tube, secured, as I believed, completely with a cork. For a few days the insects remained quiet, occasionally voiding feces; thus showing that the females, at least, are destined to take food, and survive for some time. But at the end of ten days or a fortnight I found, to my surprise, that the glass tube had become nearly empty, almost the whole of the insects I had inclosed in it having escaped, although the cork had not once been removed during the interval. They had contrived to insinuate themselves into slight depressions in the sides of the cork, between it and the glass, as I found one or two thus in the act of escaping; while others, which had obtained their liberty, were noticed in different parts of the room, one or two being found in the window and elsewhere. This fact, trifling as it is, is interesting, as probably illustrative of the penetrating, fossorial habits of the species, and, with other circumstances, leads me to believe that the insect penetrates into the closed cell of the bee to deposit her eggs on the nearly full-grown larva within.

Happening about the 20th of November, seven or eight weeks after this observation, to examine a box in which I had placed some larvæ of *Anthophoræ* in partially opened cells, I noticed a small parasite attached to the surface of one of them, and which, from its size, I at first mistook for a larva of *Monodontomerus*. But on opening the box again, about a week afterwards, I remarked that the parasite had but slightly increased in dimensions; while, on closer examination, I found within the cell, beside the bee-larva, three perfect female *Anthophorabiæ*; and on watching these for a few minutes, two of them seemed to be engaged in oviposition. I then saw that instead of there being only one or two parasitic larvæ attached to the skin of the young *Anthophora*, there were many, in very different stages of growth; from that which I had first observed, and which had nearly attained its full size, to others which did not exceed the fifth of a line in length. I now concluded that these were not the larvæ of *Monodontomerus*, as I first supposed, but of *Anthophorabia*, an opinion which was confirmed by subsequent examination with the microscope; and this further induced me to think that the females noticed were, as they appeared to be, depositing ova. I did not observe any of these larvæ parasites on the young *Anthophoræ* at the time of procuring them from their natural haunts in September, when the cells were first broken and their inmates exposed, at which time they appeared to be quite healthy. Nevertheless, one or two of the parasites now upon them were nearly full-grown, and measured nearly a line in length, while others were so small as to be hardly recognizable; thus giving further reason to suppose that the eggs had been deposited and hatched at different periods. The way in which this appeared to be capable of explanation was, that some of the female *Anthophorabiæ* which had escaped from the glass tube, as just stated, had sought out these larvæ of *Anthophoræ*, which lay exposed in their cells in the box near to where I had placed the tube from which they escaped, and insinuating themselves into the box, had at different times deposited their eggs on the young bee-larva; and that, owing to the gradually decreasing temperature of the season, the parasites produced from the eggs last deposited had been more delayed in their growth, a high temperature being as necessary to the development of them as to that of the young bee.

From the circumstance that each parasite was attached to the surface of the bee, and fed upon it from without, like the larva of *Monodontomerus*, it was evident that the female does not insinuate her eggs into the body of the bee, but merely attaches them to its skin; while from the circumstance of nearly the whole of the females I had confined in the tube having escaped by insinuating themselves between the sides of the cork and the glass, and forcing their way through chinks which appeared much too small to admit of their passage, there seems reason to think that the usual habit of this species may be to penetrate into the cell of *Anthophora* after it has been closed, and deposit her eggs on the nearly full-grown inmate. This supposition is further countenanced by the acute and denticulated form of the mandibles of the female, and by the absence of an exerted ovipositor, which structure would perhaps be necessary under other circumstances. Further, also, that the bee is infested not by a few, but by an abundance,—a whole brood of these creatures,—which entirely destroy it.

I have allowed my bee-larva, with its parasites, to remain in a cold room up to the present time, but the latter have scarcely at all increased in size, and yet they remain firmly attached to their victim, appearing scarcely even to vegetate.

This is precisely the condition in which the bee itself remains during winter; both that and its parasites requiring a high temperature of the sand-bank, heated by the sun's rays, for their evolution.

DESCRIPTION OF THE FIGURES.

TAB. VIII.

Fig. 4. *Anthophorabia fasciata*, male :—magnified.

- a. The antenna of the male.
- b. Posterior leg.
- c. Inferior surface of the middle leg.

Fig. 5. *A. fasciata*, female :—magnified.

- a. The same, with the wings expanded.
- b. The antenna.
- c. The mandible.
- d. Posterior leg.

Fig. 6. The pupa, or nymph.